REMARKS

The present Amendment amends claims 1, 3-5, 7, 9, 12, 14 and 16-19, and cancels claims 2, 6, 8, 10, 11, 13 and 15. Therefore, the present application has pending claims 1, 3-5, 7, 9, 12, 14 and 16-19.

Claims 1, 3-7, 9, 10, 12 and 14-18 stand rejected under 35 USC §102(b) as being anticipated by Aharoni (U.S. Patent No. 6,014,694); and claim 19 stands rejected under 35 USC §103(a) as being unpatentable over Aharoni in view of Firestone (U.S. Patent No. 6,965,646). These rejections are traversed for the following reasons. Applicants submit that the features of the present invention as now recited in claims 1, 3-7, 9, 10, 12 and 14-19 are not taught or suggested by Aharoni or Firestone whether taken individually or in combination with any of the other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw these rejections.

Amendments were made to the claims to more clearly describe the features of the present invention as recited in the claims. Particularly, amendments were made to the claims to recite that the present invention is directed to a motion picture transmission method and apparatus for transmitting a motion picture signal from an input terminal to a plurality of video reception units, respectively, through a video transmission unit including a compression processing unit and a plurality of transmission lines, each of which has a different transmission speed.

According to the present invention the method includes generating stream data containing at least a Group of Pictures (GOP) having an Intra (I) picture and a plurality of Predictive (P) pictures relating to each picture of said

motion picture signal in said compression processing unit, said stream data is receivable at a video reception unit connected via a transmission line having higher transmission speed than the bit rate of said stream data, storing a latest of said GOP into a memory unit of said video transmission unit, said memory unit being commonly used via said transmission lines, and transmitting said I picture and a different number of consecutive P pictures in the latest of said GOP on a GOP unit based on varying said different number in response to different transmission speeds of said transmission lines, respectively.

A video data transmission apparatus of the present invention re-encodes a standard image in accordance with a network to be used for distributing to the network, motion picture streaming such as MPEG-4 or H.264, so as to store it into a buffer per a bit rate. The present invention is not a system which selects a buffer to be transmitted in response to a request, but transmits encoded picture data, (e.g. a 6 Mbps encoded image) sequentially, based on an I frame; and the transmission is started from an I frame to a client, which cannot transmit all of the frames (I frame and P frame), when the latest I frame is made.

According to the video data transmission apparatus of the present invention, it is not necessary to determine whether what kilo Bps of images are to be transmitted to each client, and if a picture(s) cannot be transmitted in a network to be used, the transmission is started automatically from an I frame when the latest I frame is made, so that the problems such as image delay can be avoided.

Further, according to the video data transmission apparatus of the present invention, it is a best-effort apparatus. Therefore, if an image request occurs from a plural of clients, all of the frames may not be transmitted, in spite of the fact that a high-speed network is used. In this case, the transmission is started automatically from an I frame when the latest I frame is made, so that the problems such as image delay can be avoided.

As an applied example of the present invention, the video data transmission apparatus makes a 6 Mbps image and receives information (e.g. a line of what kilo Bps is currently used and so on) on a network to be used from each client, and transmits to each client from the latest I frame which is encoded, sequentially, by adjusting a, transmission interval, so as to reduce a packet loss into the network, as well as, displays a 6 Mbps image, which is a standard image, to each client using a plural of different networks without delay, and without block-noise images at the time of decoding, by keeping the relation between an I frame and a P frame.

The above described features of the present invention as now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention are not taught or suggested by Aharoni or Firestone.

Aharoni teaches a system for adaptively transporting video over networks wherein the available bandwidth varies with time. As per Aharoni, a video/audio codec is provided that functions to compress, code, decode and decompress video streams that are transmitted over networks having available bandwidths that vary with time and location. In Aharoni depending

on the channel bandwidth, the system adjusts the compression ratio to accommodate a plurality of bandwidths ranging from 20 Kbps for POTS to several Mbps for switched LAN and ATM environments. Bandwidth adjustability is provided by offering a trade-off between video resolution, frame rate and individual frame quality. The system as taught by Aharoni generates a video data stream comprised of Key, P and B frames from a raw source of video. Each frame type is further comprised of multiple levels of data representing varying degrees of quality. In addition, several video server platforms can be utilized in tandem to transmit video/audio information with each video server platform transmitting information for a single compression/resolution level.

With the use of one stream data generated from a motion picture signal, the present invention allows transmission to be suitable for transmission lines having various speeds, by varying a number of P pictures stored into GOP. Relating to "transmitting a different number of consecutive P pictures in the latest of said GOP", which is one of the technical features of the present invention,

Aharoni discloses, from line 40 to 60 in column 12, that "the packet generator may skip the frames", but that method is, as described from line 59 to 67 in column 12 thereof, based on time (of the video information, which is queued for display at the client). Thus, there is no teaching or suggestion in Aharoni that the continuity of P pictures is assured. Thus, according to the present invention, within a series of P pictures under such a relation that each refers to a P picture just before, "continuity" is achieved by canceling "afterpart thereof", but on the other hand, that "continuity" cannot be assured

if skipping in the middle in the series of P pictures. In general, if trying to be faithful to time (a timestamp given per a frame), the skip occurs, intermittently, at an interval 'shorter than that of GOP. Therefore, it cannot be interpreted by the disclosure of Aharoni that "continuity" can be assured when a P frame is skipped. According to line 13 to 15 in column 9 of Aharoni, it should be assumed that a frame skip is performed on a B frame (or the whole 1 GOP). Thus, in Aharoni since the GOP size is determined by bandwidth depending on the level, therefore, from this point, it is unlikely that a frame skip is performed also upon the P frame.

Relating to "said stream data is receivable at an video reception unit connected via a transmission line having higher speed", which is another technical feature of the present invention. In Aharoni it is disclosed, from line 42 to 49 in column 10, that "for each GOP, the video client only receives data corresponding to a single level-data of different levels cannot be sent within a GOP". That is to say, it is clearly denied in Aharoni that the generated GOP (stream data) is transmitted as it is, (i.e., unchanged), regardless of how high-speed a transmission line is.

Relating to "memory unit (storing the latest of said GOP, and) being commonly used via said transmission lines", which is the other technical feature of the present invention. However, this technical feature of the present invention is not taught or suggested by Aharoni, particularly from lines 45 to 60 in column 18 thereof. That is to say, according to the following descriptions; "Each of the N video servers 216 can comprise the video server 18 (Fig. 2)", described in line 67 in column 18; "Each client that requests a connection ... causes an instance of the sender to be created.", described

from line 63 to 65 in column 7; and "the packet transmitter maintains a buffer of packets transmitted to the client", described from line 3 to 5 in column 13 of the reference, it is obvious that the buffers are not used in common, since the buffers equivalent to a number of clients are created into a server 216.

Further, according to the present invention defined in Claim 4, the technical feature thereof lies in "canceling transmission of an afterpart of said consecutive P pictures". On the other hand, referring to from line 15 to 35 in col. 13 or from line 22 to 49 in column 10 of Aharoni it can be interpreted that the video quality is different depending on the level, however, it is not disclosed that a frame is deleted or a frame rate is changed. Thus, it is neither disclosed nor taught that the transmission is restarted from the next I frame subsequent to a P frame, if the transmission of a P frame is canceled.

Further, according to the present invention defined in Claim 18, the technical feature thereof lies in that a subsequent request is transmitted after a picture is received and decompressed in a reception unit, (that is to say, an ACK is returned per a picture unit). However, in Aharoni it is determined when a subsequent packet is to be sent out based on time when an ACK is returned, that is to say, it is controlled by a packet unit, but not controlled by a picture unit.

In comparison with Aharoni which necessitates a plurality of compression levels, according to the present invention, since only a piece of stream data is generated, the amount of processing can be reduced. Further, with regard to a transmission buffer, the preparation for 1 GOP in common is enough for a plurality of video reception units, therefore, a memory capacity can be made much smaller.

However, Aharoni fails to teach or suggest numerous features of the present invention as now recited in the claims. For example the present invention as recited in the claims includes first and second features not taught or suggested by Aharoni.

The first feature of the present invention includes generating Groups of Pictures (GOPs) having at least an Intra (I) picture and a plurality of Predictive (P) pictures relating to each picture of the motion picture signal in the compression processing unit, storing the latest of the GOPs in a memory unit of the video transmission unit, the memory unit being commonly used via the transmission lines.

Thus, as per the first feature of the present invention Groups of Pictures (GOPs) having the I picture and a plurality of P pictures relating to each picture of the motion picture signal are generated in the compression processing unit from each picture and the latest of the GOPs are stored in the memory unit which is commonly used via the transmission lines.

The second feature of the present invention includes transmitting the I picture and a different number of P pictures each of which is read out from the memory unit on a GOP unit basis and consecutively in response to different transmission speeds of the transmission lines to a plurality of video reception units, respectively.

Thus, as per the second feature of the present invention compressing (encoding) only one video stream, I picture and a different number of P pictures are read out from the memory unit on a GOP unit basis and consecutively are transmitted to respective reception units in different transmission speeds.

The above described first and second features of the present invention as recited in the claims are not taught or suggested by Aharoni.

Aharoni discloses a system that functions to generate a prioritized video data stream including multiple levels from a raw source of video. This video stream as taught by Aharoni is stored in a file and accessed by the video server when servicing clients. Attention is directed to in col. 2, lines 29 to 32 of Aharoni.

Aharoni further discloses that the function of the video compression/file generator is to compress the raw video source into multiple levels of varying quality. In particular, as per Aharoni the raw video source is compressed into three types of data objects commonly referred to as frames. The three types of frames include Key frames, P frames and B frames. These frames are similar to the I frames, P frames and B frames, respectively. Attention is directed to col. 8, lines 54 to 63, of Aharoni.

Aharoni still further discloses that every frame (Key, P and B frames) output by the video compression/file generator is composed of data from all five levels. Thus, the video source file as per Aharoni contains data representing a broad variation in output video quality and the video compression/file generator functions to assemble GOPs each having a particular combination of Key, P and B frames. Attention is directed to col. 10, lines 33 to 39, and also diagrams illustrating five levels in Figs. 5, 6 and 7 of Aharoni.

Thus, in Aharoni, some frames of a level may not be sent. That is, Aharoni discloses a technique of video compression/file generator 14 as shown in Fig. 1 thereof that converts a raw video source 12 shown in Fig. 1

into five levels (that is, quality of a frame) of each of Key frames, P frames and B frames. Those levels as per Aharoni are prepared previously and filed in the video compression/file generator 14, and in response to the requirement of a client, the video compression/file generator 14 sends one frame selected from the five levels of the frames shown in Fig. 5, 6 and 7. These features as disclosed by Aharoni are entirely different from the features of the present invention as recited in the claims.

Specifically, the first and second features of the present invention as now recited in the claims are not taught or suggested by Aharoni. According to the present invention in the first feature Groups of Pictures (GOPs) having the I picture and a plurality of P pictures relating to each picture of the motion picture signal are generated in the compression processing unit from each picture and the latest of the GOPs are stored in the memory unit which is commonly used via the transmission lines. Further, according to the present invention in the second feature compressing (encoding) only one video stream, I picture and a different number of P pictures are read out from the memory unit on a GOP unit basis and consecutively are transmitted to respective reception units in different transmission speeds. These first and second features of the present invention as recited in the claims are not taught or suggested by Aharoni.

Thus, Aharoni fails to teach or suggest generating stream data containing at least a Group of Pictures (GOP) having an Intra (I) picture and a plurality of Predictive (P) pictures relating to each picture of said motion picture signal in said compression processing unit, said stream data is receivable at a video reception unit connected via a transmission line having

higher transmission speed than the bit rate of said stream data as recited in the claims.

Further, Aharoni fails to teach or suggest storing a latest of said GOP into a memory unit of said video transmission unit, said memory unit being commonly used via said transmission lines, and transmitting said I picture and a different number of consecutive P pictures in the latest of said GOP on a GOP unit based on varying said different number in response to different transmission speeds of said transmission lines, respectively as recited in the claims.

Therefore, Aharoni fails to teach or suggest the features of the present invention and as such does not render obvious the claimed invention. Accordingly, reconsideration and withdrawal of the 35 USC §102(b) rejection of claims 1, 3-7, 9, 10, 12 and 14-18 as being anticipated by Aharoni is respectfully requested.

The same deficiencies of Aharoni as noted above can also be found in Firestone.

Particularly, Firestone, the same as Aharoni, fails to teach or suggest generating stream data containing at least a Group of Pictures (GOP) having an Intra (I) picture and a plurality of Predictive (P) pictures relating to each picture of said motion picture signal in said compression processing unit, said stream data is receivable at a video reception unit connected via a transmission line having higher transmission speed than the bit rate of said stream data as recited in the claims.

Further, Firestone, the same as Aharoni, fails to teach or suggest storing a latest of said GOP into a memory unit of said video transmission

unit, said memory unit being commonly used via said transmission lines, and transmitting said I picture and a different number of consecutive P pictures in the latest of said GOP on a GOP unit based on varying said different number in response to different transmission speeds of said transmission lines, respectively as recited in the claims.

Therefore, Firestone the same as Aharoni, fails to teach or suggest the features of the present invention and combining Firestone with Aharoni in the manner suggested by the Examiner in the Office Action does not render obvious the claimed invention. Accordingly, reconsideration and withdrawal of the 35 USC §103(a) rejection of claim 19 as being unpatentable over by Aharoni in view of Firestone is respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the reference utilized in the rejection of claims 1, 3-5, 7, 9, 12, 14 and 16-19.

In view of the foregoing amendments and remarks, Applicants submit that claims 1, 3-5, 7, 9, 12, 14 and 16-19 are in condition for allowance. Accordingly, early allowance of the present application based on claims 1, 3-5, 7, 9, 12, 14 and 16-19 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any

overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (520.43300X00).

Respectfully submitted,

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